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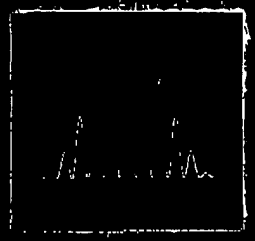

TELEVISION MEASUREMENTS

NTSC SYSTEMS

GLOSSARY OF TELEVISION TERMS

AC-COUPLED A connection which removes the constant voltage (DC component) on which the signal (AC component) is riding. Usually implemented by passing the signal through a capacitor.

AM Amplitude Modulation (AM) is the process by which the amplitude of a high-frequency carrier is varied in proportion to the signal of interest. In the NTSC television system, AM is used to encode the color information and to transmit the picture.

Several different forms of AM are differentiated by filtering of the sidebands and whether or not the carrier is suppressed. Double sideband suppressed carrier is used to encode the NTSC color information, while the signal is transmitted with a vestigial sideband scheme.

APL Average Picture Level. The average signal level (with respect to blanking) during active picture time, expressed as a percentage of the difference between the blanking and reference white levels.

BACK PORCH The portion of the video signal which lies between the trailing edge of the horizontal sync pulse and the start of the active picture time. Burst is located on back porch.

BANDWIDTH The range of frequencies over which signal amplitude remains constant (within some limit) as it is passed through a system.

BASEBAND Refers to the composite video signal as it exists before modulating the picture carrier. Composite video distributed throughout a studio and used for recording is at baseband.

BLACK BURST Also called "color black", black burst is a composite video signal consisting of all horizontal and vertical synchronization information, burst, and usually setup. Typically used as the house reference synchronization signal in television facilities.

BLANKING LEVEL Refers to the 0 IRE level which exists before and after horizontal sync and during the vertical interval.

BREEZEWAY The portion of the video signal which lies between the trailing edge of the horizontal sync pulse and the start of burst. Breezeway is part of back porch.

BROAD PULSES Another name for the vertical synchronizing pulses in the center of the vertical interval. These pulses are long enough to be distinguished from all others, and are the part of the signal actually detected by vertical sync separators.

BURST A small reference packet of the subcarrier sine wave, typically 8 or 9 cycles, which is sent on every line of video. Since the carrier is suppressed, this phase and frequency reference is required for synchronous demodulation of the color information in the receiver.

B-Y One of the color difference signals used in the NTSC system, obtained by subtracting luminance from the blue camera signal. This is the signal which drives the horizontal axis of a vectorscope.

CHROMINANCE Chrominance refers to the color information in a television picture. Chrominance can be further broken down into two properties of color: hue and saturation.

CHROMINANCE SIGNAL The high-frequency portion of the video signal which is obtained by quadrature amplitude modulation of a 3.58 MHz subcarrier by R-Y and B-Y.

COLOR DIFFERENCE SIGNALS Signals used by color television systems to convey color information in such a way that the signals go to zero when there is no color in the picture. R-Y, B-Y, I and Q are all color difference signals.

COMPONENT VIDEO Video which exists in the form of three separate signals, all of which are required in order to completely specify the color picture. For example: R, G and B or Y, R-Y, and B-Y.

COMPOSITE VIDEO A single video signal containing all of the necessary information to reproduce a color picture. Created by adding quadrature amplitude modulated R-Y and B-Y to the luminance signal.

CW Continuous Wave. Refers to a separate subcarrier sine wave used for synchronization of chrominance information.

dB (DECIBEL) A decibel is a logarithmic unit used to describe signal ratios. For voltages,

$$dB = 20 \log_{10}\left(\frac{V_1}{V_2}\right)$$

DC-COUPLED A connection configured so that both the signal (AC component) and the constant voltage on which it is riding (DC component) are passed through.

DC RESTORER A circuit used in picture monitors and waveform monitors to clamp one point of the waveform to a fixed DC level.

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GLOSSARY OF TELEVISION TERMS

DEMODULATOR In general, this term refers to any device which recovers the original signal after it has modulated a high frequency carrier. In television, it may refer to:

(1) An instrument, such as a Tektronix 1450, which takes video in its transmitted form (modulated picture carrier) and converts it to baseband.

(2) The circuits which recover R-Y and B-Y from the composite signal.

EQUALIZER The pulses which occur before and after the broad pulses in the vertical interval.

ENVELOPE DETECTION A-demodulation process in which the shape of the RF envelope is sensed. This is the process used by a diode detector.

FIELD In interlaced scan systems, the information for one picture is divided up into two fields. Each field contains one half of the lines required to produce the entire picture. Adjacent lines in the picture are in alternate fields.

FM Frequency Modulation (FM) is the process by which the frequency of a carrier signal is varied in proportion to the signal of interest. In the NTSC television system, audio information is transmitted using FM.

FRAME A frame contains all the information required for a complete picture. For interlaced scan systems, there are two fields in a frame.

FRONT PORCH The portion of the video signal between the end of active picture time and the leading edge of horizontal sync.

GAMMA Since picture monitors have a nonlinear relationship between the input voltage and brightness, the signal must be correspondingly predistorted. Gamma correction is always done at the source (camera) in television systems: the R, G and B signals are converted to $R^{1/\gamma}$, $G^{1/\gamma}$ and $B^{1/\gamma}$. Values of about 2.2 are typically used for gamma.

GENLOCK The process of locking both sync and burst of one signal to sync and burst of another, making the two signals completely synchronous.

GRATICULE The scale which is used to quantify the information on a waveform monitor or vectorscope display. Graticules may either be screened onto the faceplate of the CRT itself (internal graticule), or onto a piece of glass or plastic which fits in front of the CRT (external graticule). They can also be electronically generated.

HARMONIC DISTORTION If a sine wave of a single frequency is put into a system, and harmonic content at multiples of that frequency appears at the output, there is harmonic distortion present in the system. Harmonic distortion is caused by nonlinearities in the system.

HORIZONTAL BLANKING Horizontal blanking is the entire time between the end of the active picture time of one line and the beginning of active picture time of the next line. It extends from the start of front porch to the end of back porch.

HORIZONTAL SYNC Horizontal sync is the –40 IRE pulse occurring at the beginning of each line. This pulse signals the picture monitor to go back to the left side of the screen and trace another horizontal line of picture information.

HUE Hue is the property of color which allows us to distinguish between colors such as red, yellow, purple, etc.

HUM Undesirable coupling of the 60 Hz power sine wave into other electrical signals.

INTERCARRIER SOUND A method used to recover audio information in the NTSC system. Sound is separated from video by beating the sound carrier against the video carrier, producing a 4.5 MHz IF which contains the sound information.

IRE A unit equal to 1/140 of the peak-to-peak amplitude of the video signal, which is typically one volt. The 0 IRE point is at blanking level, with sync tip at –40 IRE and white extending to +100 IRE. IRE stands for Institute of Radio Engineers, the organization which defined the unit.

LINEAR DISTORTION Refers to distortions which are independent of signal amplitude.

LUMINANCE The signal which represents brightness, or the amount of light in the picture. This is the only signal required for black and white pictures, and for color systems it is obtained as a weighted sum (Y = 0.3R + 0.59G + 0.11B) of the R, G and B signals.

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